

A New Species of *Serpulorbis*

(Gastropoda : Vermetidae)

from South Africa

BY

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(4 Text figures)

INTRODUCTION

IN DECEMBER 1975, a new species of *Serpulorbis* was discovered living on stones within the mouth of the Umngazana estuary near Port St. Johns, Transkei and in large rock pools on the open coast outside the estuary. The species is named *Serpulorbis* (*Serpulorbis*) *aureus* after the golden yellow colour of the exposed parts of the living animal. The taxonomy is based on KEEN (1961).

DESCRIPTION

Taxonomy

Genus *Serpulorbis* Sassi, 1827

Subgenus (*Serpulorbis*) Keen, 1961

Serpulorbis (*Serpulorbis*) *aureus* Hughes, spec. nov.

Morphology

SHELL

The adult shell (teleoconch) is cemented to the substratum forming a dextral spiral with loose concentric whorls. The whorls are approximately triangular in cross-section with the flat base cemented to the substratum. Their surface is textured with low axial ridges which are sigmoid in lateral aspect (Figure 1a). A few individuals possess faint longitudinal ridges. The outer whorl is extended into a vertical feeding tube circular in cross-section. Scars of old feeding tubes are evident at every quarter or half whorl. The holotype is 2.5 cm across its outer whorl, the feeding tube is 1.5 cm long with an internal diameter of 4 mm. Most adults are approximately of this size.

The protoconch is about 1 mm long, mostly clear but with a brown tinge to the dorsal lip or hood of the aperture. The apical whorl is almost as large as the basal whorl (Figure 2a).

ADULT BODY

The animal reaches a length of about 4 cm. The shapes and relative proportions of the various organs are shown in Figure 3a. Brooding females have a deep dorsal cleft in the mantle (Figure 3b) to accommodate the egg capsules which hang from the roof of the shell. The head, foot and exposed part of the mantle have a golden yellow background colour which fades after fixation. The mantle edge is coloured with alternate bands of golden yellow and dark brown. In many individuals the foot and dorsal parts of the head are dark brown.

EGG CAPSULES AND EMBRYOS

A brooding female contained 20 egg capsules attached to the roof of the shell in 2 staggered ranks (Figure 2c) from the base of the feeding tube to half way along the outer whorl. Older capsules each contained about 30 advanced embryos. Younger capsules contained eggs with a distinctive pale green yolk. The green colour is lost on fixation. The advanced embryos had well developed protoconchs and were clearly destined for benthic life after hatching.

RADULA

The radula, shown in Figure 4a, has a row formula of 2 · 1 · 1 · 1 · 2. The rachidian tooth has convex sides while the inner marginal tooth has 2 or 3 well developed lateral cusps on its outer edge and 2 lateral cusps on its inner edge.

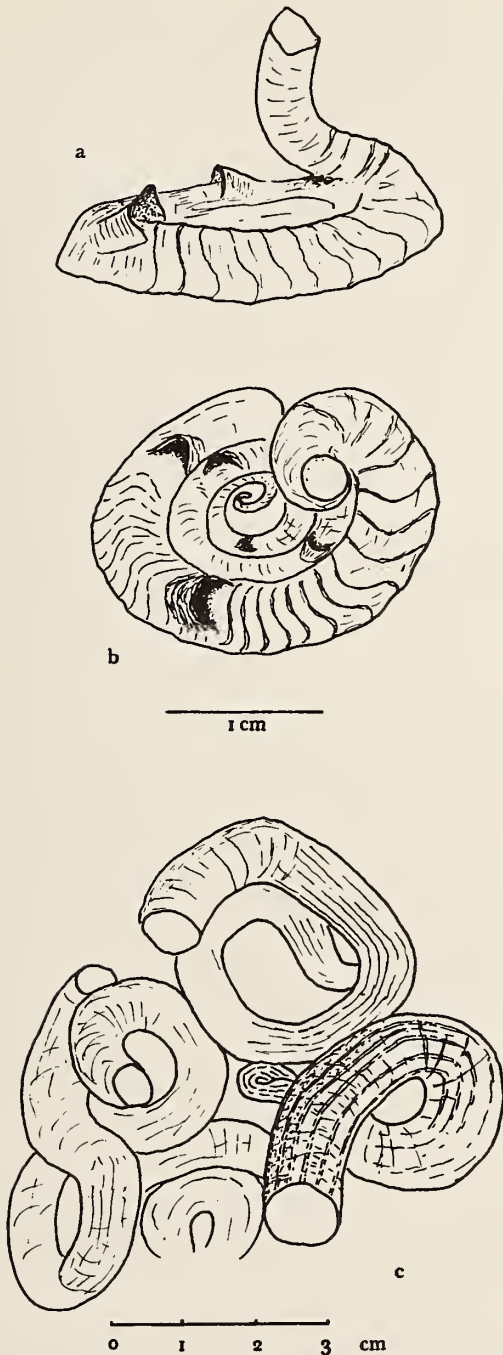


Figure 1

- (a) *Serpularia aureus* holotype from lateral aspect
- (b) Holotype from above
- (c) *Serpularia natalensis*

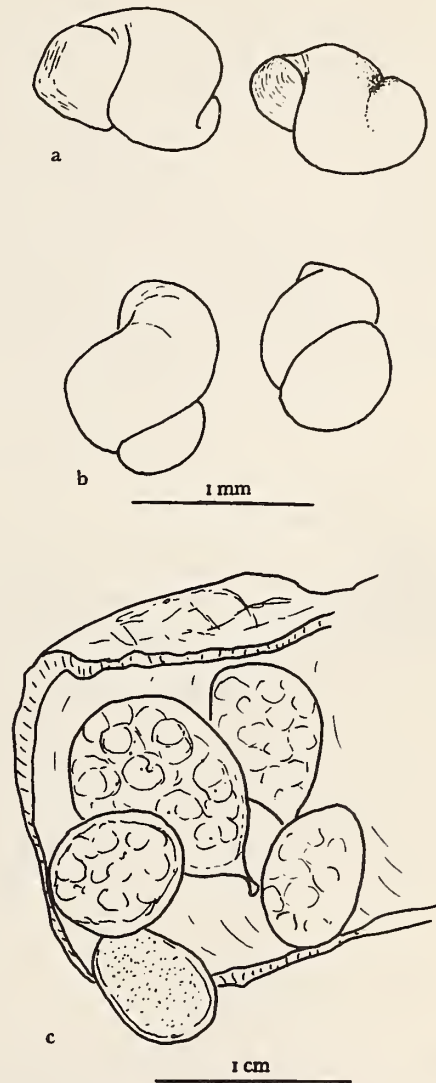


Figure 2

- (a) Protoconchs from left lateral aspect
- (b) Protoconchs from dorsal aspect

In both figures the larger protoconch is of *Serpularia natalensis* and the smaller protoconch is of *Serpularia aureus*

- (c) *Serpularia aureus* egg cases attached to the roof of the adult shell

DIAGNOSIS

Genus *Serpularia*: lack of operculum in adult; bright pigmentation of exposed body.

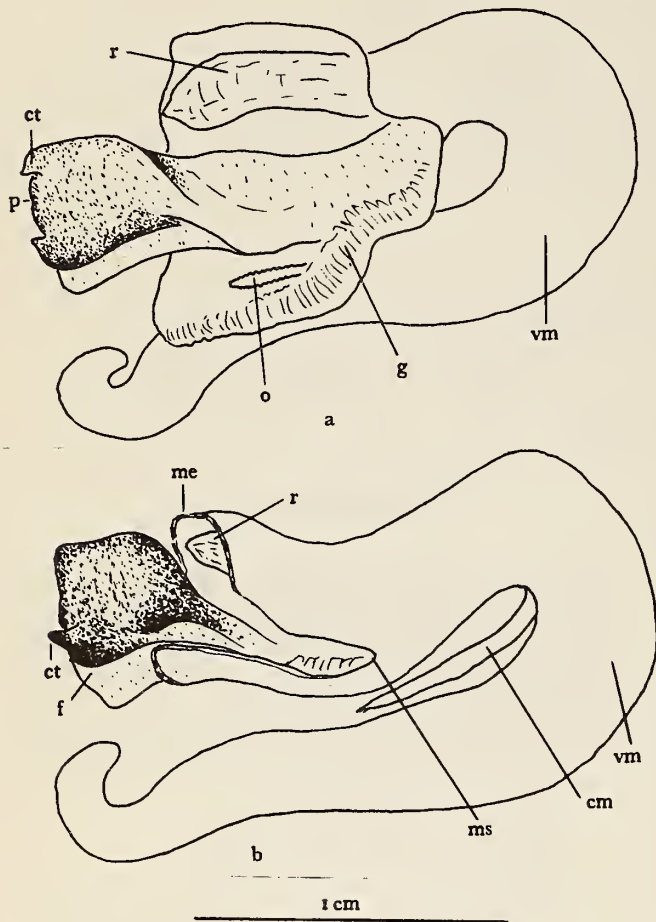


Figure 3

Serpularbia aureus

- (a) The mantle slit has been opened further to expose the contents of the mantle cavity
 - (b) The intact female showing the dorsal slit in the mantle through which the egg capsules hang
- cm - columellar muscle ct - cephalic tentacle f - foot
 g - gill me - mantle edge ms - mantle slit
 o - osphradium p - proboscis r - rectum
 vm - visceral mass

Subgenus (*Serpularbia*): shell not tightly planorboid throughout life.

Species *aureus*: adult shell with concentric whorls and vertical feeding tube; protoconch clear, apical whorl almost as large as basal whorl; rachidian tooth with convex sides, inner marginal tooth with at least 2 lateral

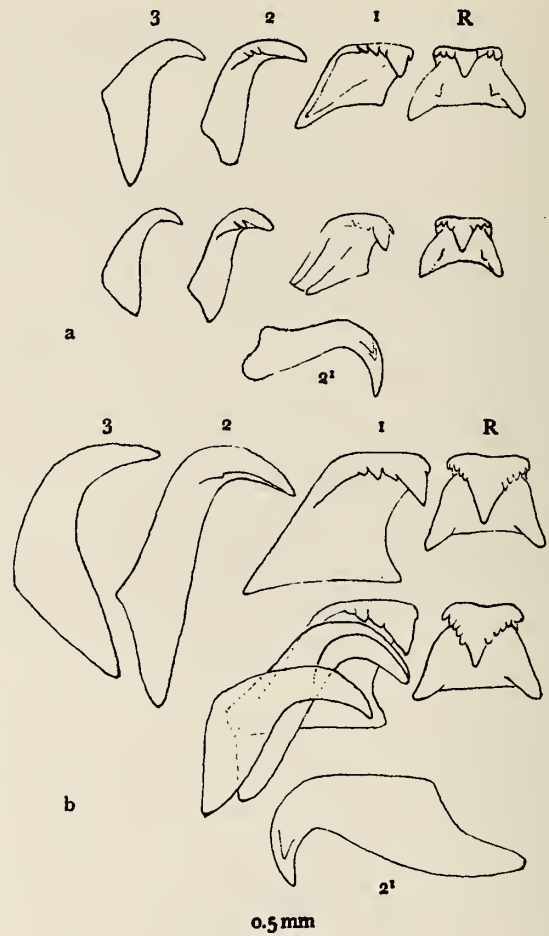


Figure 4

Radular teeth of

- (a) *Serpularbia aureus*
 - (b) *Serpularbia natalensis*
- R - rachidian 1 - lateral 2 - inner marginal (marginal 1)
 3 - outer marginal (marginal 2)
 2' - lateral aspect of inner marginal showing cusps

cusps on each side; exposed body with golden yellow background colour; embryos with pale green yolk.

TYPE MATERIAL

British Museum [Natural History], Department of Zoology. Holotype 1976/W/1. Embryos 1976/W/2. Late embryos 1976/W/3.

TYPE LOCALITY

On stones at side of main channel, southern shore, mouth

Table 1

<i>Serpulorbis aureus</i>	<i>Serpulorbis natalensis</i>
Body up to 4 cm long.	Body up to 6 cm long.
Foot, head and mantle with golden yellow background colour.	Background colour orange.
Yolk pale green.	Yolk pale yellow.
Sides of rachidian tooth convex.	Sides of rachidian tooth concave.
Inner marginal tooth with more than one cusp on each edge.	Inner marginal tooth with one or no cusp on each edge.
Protoconch mostly clear, apical whorl almost as large as basal whorl.	Protoconch pale brown, apical whorl much smaller than basal whorl.
Teleoconch with dextral, usually concentric spirals triangular in cross-section, vertical feeding tube circular in cross-section.	Teleoconch vermiform or with loose laterally displaced spirals circular in cross-section. No feeding tube. Sculptured with longitudinal ridges and fine axial striae.
Feeding tube scars evident. Sculptured with axial ridges sigmoid in lateral aspect.	

of Umngazana estuary near Port St. Johns, Transkei, South Africa, 32° S; 29½° E.

HABITAT

Serpulorbis aureus forms loose aggregations on the tops of large silt-covered stones (HUGHES, in press a, fig. 2) at the edge of the main tidal current in the Umngazana estuary. They are not uncovered at low tide. Isolated individuals were also found in large tide pools at mid to high tide level outside the estuary. The feeding tube raises the head away from the silty substratum and thus avoids excessive clogging of the mucous net which is used for feeding. The shell whorls of the estuarine individuals were covered with short algae matted with silt.

DISCUSSION

It is possible that *Serpulorbis aureus* has been confused previously with *S. natalensis* (Mörch, 1862) which is an abundant species in more southerly waters of the Cape Province (HUGHES, in press b). Anatomical differences between the two species are summarized in Table 1, Figures 1a, 1b, 2a, 2b and 4a, 4b. The anatomy of the soft parts shows little variation within the genus (MORTON, 1951). *Serpulorbis aureus* and *S. natalensis* differ in microhabitat, *S. aureus* colonising the upper surfaces of stones in turbid water whereas *S. natalensis* usually colonises the under surfaces of stones where silting is less heavy. Feeding tubes raising the head away from the substratum are not found in *S. natalensis* (personal observations).

Serpulorbis aureus probably replaces *S. natalensis* as an ecological equivalent in the warmer waters of the South African Indian Ocean just as *Dendropoma tholia* Keen & MORTON, 1960 replaces *D. corallinaceum* (Tomlin, 1939) (HUGHES, in press b).

The coiled shell with vertical feeding tube of *Serpulorbis aureus* closely resembles that of *S. squamigerus* (Carpenter, 1857) of Californian waters, but the latter is distinguished by its geographical range and by its predominantly black colour with orange pigmentation around the foot and lateral regions of the head (HADFIELD, 1970).

ACKNOWLEDGMENTS

I thank George Branch for inviting me on the expedition to Umngazana and for pointing out the colony of *Serpulorbis aureus* in front of our camp site.

Literature Cited

- HADFIELD, MICHAEL G.
1970. Observations on the anatomy and biology of two California vermetid gastropods. *The Veliger* 12 (3): 301-309; pl. 45; 5 text figs. (1 January 1970)
- HUGHES, ROGER N.
in press a. Colonialism in Vermetidae. *In: Biology and systematics of colonial organisms.* Spec. Vol. Syst. Assoc.
in press b. The biology of *Dendropoma corallinaceum* and *Serpulorbis natalensis*, two South African vermetid gastropods. *Zool. Journ. Linn. Soc.*
- KEEN, A. MYRA
1961. A proposed reclassification of the gastropod family Vermetidae. *Bull. Brit. Mus. (Nat. Hist.) (Zool.)* 7: 183-213